Space Weather Forecast

Issued on Saturday, 24 February 2024 at 00:43 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares expected with a chance of Strong flares. Chance of G1/Minor geomagnetic storm mainly on Day 2 (25 Feb). Slight but increasing chance of radiation storms.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate over the past 24 hours, with the largest flare peaking at 23/1747 UTC from a region in the northeast, which was also recently responsible for the largest flare of the solar cycle so far. This remains, by far, the largest and most complex region. There has been rearrangement of the spots within its intermediate spot, with some magnetic complexity, but also some signs it may be increasing in complexity. There remains significant looping evident in imagery, with further large flares possible from this region. The remaining regions are much smaller and appear simpler, however, a region close to the southeast limb likely contains the remnants of a previously active region which has returned after two weeks transiting the far side of the Sun. This and two further regions close to the eastern horizon may reveal more complexity as they rotate into clear view on the disc.
No Earth directed Coronal Mass Ejections (CMEs) were seen in the last 24 hours.
Solar Wind / Geomagnetic Activity: Solar winds have been at background levels. Speeds have been slow, varying between 310-360 km/s. Total magnetic field strength has been weak, with the north-south component also varying weakly. Geomagnetic activity was Quiet (Kp 0-1).
Energetic Particles / Solar Radiation: Solar radiation was very slightly above normal background levels, but well below the S1/Minor Radiation Storm threshold.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is forecast to remain Moderate to High, with occasional Moderate flares expected and a chance of further isolated Strong flares, particularly in the near term, from the large region in the northeast.
Solar Wind / Geomagnetic Activity: There is the possibility of a glancing blow from a CME late on Day 1 (24 Feb) or early on Day 2 (25 Feb). Current solar winds are at slow levels but a coronal hole fast wind is expected to connect with Earth either later on Day 1 or more likely during Day 2. Peak wind speeds associated with this feature are likely to reach up to 500 km/s, before declining again from Day 3 into Day 4 (26-27 Feb).
Geomagnetic activity is forecast to remain Quiet initially. An increase to Unsettled to Active is possible on Days 1 and 2, with a chance of G1/Minor storm intervals, particularly if the fast wind and the glancing blow from the CME occur at similar times. Activity is then expected to decline through Day 3, becoming largely Quiet again by Day 4.
Energetic Particles / Solar Radiation: Solar radiation levels are likely to continue near background levels, but the large region in the northeast will give an increasing risk of solar radiation events as it moves into the western hemisphere of the Sun early on Day 2 (25 Feb), with a slight but increasing chance of S1/Minor Radiation Storms.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	30	10	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	75	75	70	70
Very Active	R3 to R5 X	No	40	30	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	20	20	25
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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